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IN TWO SECTIONS

Section I

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EDITORIAL DEPARTMENT NOTE

In this issue of the Bulletin we are presenting two articles dealing with accounting for the rubber industry. The first of these articles deals with the application of standard costs to a plant manufacturing rubber footwear. Attention is called specifically to the author's emphasis on the point that the setting of "tight" standards makes it possible for the management to disregard the part of costs which is standard and direct attention only to the variance. The author of this article is John J. Wrinn, who has been closely connected with costs in the rubber industry for the last seventeen years. After graduating from Naugatuck High School he entered banking from which field, after three years, he entered the employ of one of the United States Rubber Co. subsidiaries to do cost work. He has been associated with both the parent company and subsidiaries in various manufacturing cost capacities since that time, and is at present Cost Accountant at the Naugatuck Footwear Plant.

Our second article deals with the processing of rubber through the refining stage. The use of a numerical code to classify and control the various types of raw and processed rubber is one of those things that looks simple after it has been developed, but requires a lot of work in its development and contributes considerably to accounting effectiveness. The author of this article is F. F. Hollowbush who entered the rubber industry after considerable cost experience with the General Chemical Co. and the United States Steel Corp. For the past ten years he has been associated with the rubber sundries industry in both production and cost accounting. At present he is Cost Accountant for the Seamless Rubber Co. of New Haven, Conn. Mr. Hollowbush is at present Secretary of the New Haven Chapter, and has been elected to continue in this position for the coming year.

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NATIONAL ASSOCIATION OF
COST ACCOUNTANTS

JULY 1, 1935

RUBBER FOOTWEAR COST ACCOUNTING

By John J. Wrinn, Cost Accountant

Naugatuck Footwear Plant

United States Rubber Products, Inc., Naugatuck, Conn.

BEFORE entering the realms of cost accounting and cost control, let us briefly consider the physical aspects of rubber footwear manufacture as ordinarily found in most producing plants. Usually footwear is a major element of production combined with some other classes of rubber product of lesser importance. Footwear itself is divided into two classifications: waterproof footwear consisting of the usual run of boots, gaiters, overshoes, etc., and canvas rubber sole shoes. Naturally the product is seasonable and subject to wide fluctuations in demand on account of weather conditions.

The various classes of product ordinarily originate in a common mixing and calendering department, then separate into particular processing and finishing departments depending on the units being made. Under varying conditions, the different classes of product are found processed in common through all departments to finishing.

Production in a large plant will range from 20,000 to 60,000 pairs of rubber footwear daily, combined with from 20,000 to 40,000 pairs daily of canvas rubber sole footwear. In addition to these there may be a variety of other rubber products.

To turn out this production the plant must convert rubber and chemicals into compounded stocks. It will mix in a common mixing department as much as 3,500,000 pounds of compound monthly. These stocks are calendered, i.e., run into sheets of plain gum stock or onto fabric. As many as 750,000 yards of fabric are consumed monthly. In addition to these primary materials considerable quantities of fittings are also used. Separate plants are also maintained for the production of cartons.

Labor is particularly important in the rubber footwear industry. While numerous changes in method have occurred in recent years, basically it is still an industry where handicraft is essential to production. As many as 6,000 people have been employed in one rubber footwear plant.

Ordinarily materials make up a little better than one-third of total manufacturing costs and labor and burdens slightly less than one-third each. These proportions change rapidly with crude rubber costs, which we have seen vary from over $2 per pound, down to around 10 cents per pound with unlimited cultivation in the Far East, and up again to over $1.25 with British restriction and down to 3 cents upon the failure of such restriction.

Chart of Accounts

As illustrated by the chart of accounts in Exhibit 1, which has been somewhat simplified for presentation, we use a typical set-up of standard cost accounts for rubber footwear cost control.

Incoming materials are entered into stores accounts at invoice costs plus freight, charged out to materials consumed at average stores cost, from which account the standard cost of those materials are cleared to materials in process and the balance to purchase variation. Materials in process are credited at the close of the month with standard net material for goods produced together with a credit for all scrap produced during the month and debits and credits for all material variations. The balance remaining in the account represents the inventory balance at standard.

Labor is handled likewise through the payroll account, the balance here giving us accrued payrolls. Charges from payroll go either to direct labor or burden in process. Direct labor in process received credit for goods finished at net standard and for all scrap produced together with debits or credits for variations from standard. The remaining balance then gives us our labor in process inventory at standard.

In like manner both stores requisitions and payroll charges clear into our burden in process account. At the same time of course we are charging burden with fixed items. As on the other accounts we credit this account with standard value of finished production, scrap produced and other variations.

Moving next to the scrap account, note that this account is charged with the standard value of all scrap actually produced, less its standard salvage value, and the account is credited with standard allowance for scrap in goods finished. The balance then goes to the penalty accounts. Note here that we carry no inventory balance. Hence, if more goods are processed than finished the

true efficiency on scrap is not reflected in the current month although over a period the differences are negligible. We overcome the difficulty in our departmental reports by calculating scrap standards on the basis of work actually processed.

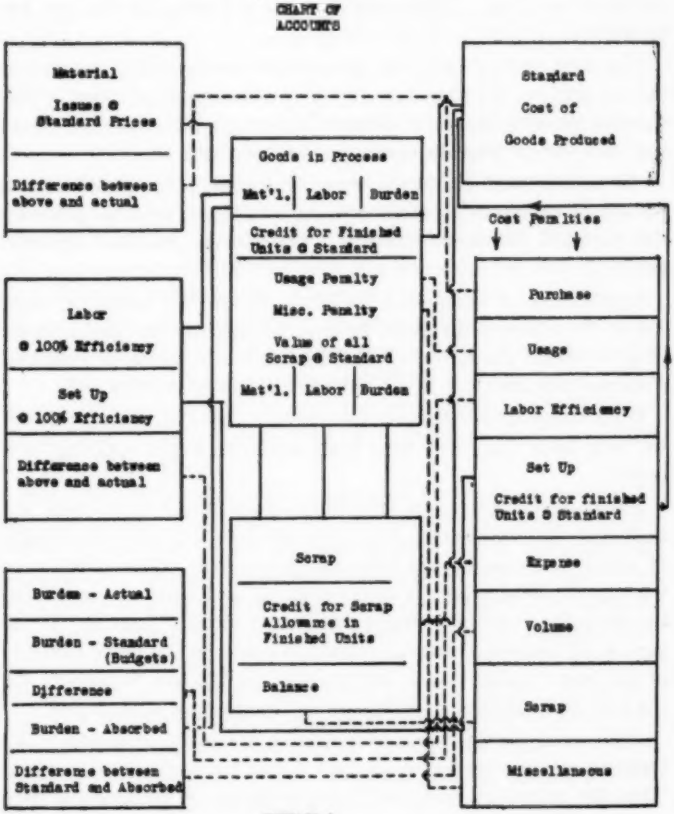


EXHIBIT 1

Cost of finished goods is cleared into finished goods inventory. Sales are costed at standard cost and inventory relieved at that value. All penalties are charged to sales of the current month.

This then in a simple way illustrates the set-up of cost accounts.

These may be carried in the general ledger. A separate cost ledger is not essential; its practical elimination will be explained later.

Building the Standards

Rubber footwear is built upon very definite specifications either industrial or local. These specifications are taken as the base for standards.

Our first problem is to set up a list of standard material prices. We do this on the authority of our purchasing department which supplies us with its best estimate of prices on each material entering into the product to cover a calendar year.

As rubber and chemicals must of necessity be mixed into a variety of compounds before entering the shoes, we next price up the chemical laboratory standard formulae at standard material prices.

Application of compound to fabric forms the following step. Using the technical divisions, figures showing the standard amount of gum which should be applied to fabric, we arrive at standard costs per square yard of all varieties of coated fabrics used.

With compound costs and square yard costs on coated fabrics. we now have the basic data from which to begin applying unit costs.

Standard patterns form the basis from which part costs are built up. Taking these patterns we lay each one out individually in order to obtain its net area and gross area. Having the area we convert it into cents of direct material and cents of scrap from the formulae costs and square yard costs already figured. If the part is all compound the conversion is made on the cubic contents of the part. Labor cost is accumulated on the part separately for the mill and calender department and the cutting department.

The same pattern is used for cutting a variety of stocks. We build up on one card costs for all stocks used with that pattern. Thus the pattern or part card is ready for use in building the shoe cost.

Before making any shoe, our technical department issues a standard specifications sheet giving all detail, such as pattern numbers, compound numbers, fabric codes, and all other materials to be used.

Taking this we apply the standard cost of each unit called for in the specification, dividing the material between direct and scrap, accumulate the total and arrive at our total standard material cost.

Labor is paid for on an efficiency base. Rates for actual payment are first set up in standard hours of credit for each 100 units completed. Every job carries an occupational rate per hour at standard. Payments to operators for hours worked are based on a ratio of standard hours produced to actual hours worked, the rate paid per actual hour varying with this ratio but not proportionately. Operators' efficiencies are figured daily and reported back to them on the following day through the medium of a daily posting sheet. Briefly summarized this is our method of wage payment.

In setting unit costs, we take the wage payment rate sheets in standard hours and occupational wages and transfer them to our unit cost sheets. An extension of the hours by the rate gives us as a unit cost at standard. There are, of course, jobs which do not vary with units produced and yet are direct labor, these are separated out into our set up labor cost at an estimated frequency rate determined from previous experience. Scrap labor allowances are at the same time separated from direct labor allowance. An addition of all of these labor cost figures brings us a total standard labor cost.

Standard burden per unit is generally applied as one rate on our direct labor. We justify the one rate in footwear due to the fact that every unit passes through all departments and practically speaking all processes within the departments. Tests have been made at various times of the effect on unit costs if burden were departmentalized and the results have been but slightly different from those obtained through the use of overall rates. We arrive at the burden rate by obtaining normal capacity figures, estimating from our burden budget allowance what controllable items will amount to at this capacity, add in the uncontrollable and fixed items, total and determine the ratio of burden to standard direct labor cost at normal capacity.

Lasts form an important item of our cost, probably comparing with tools in the metal trades, but it is seldom that we can pass on the cost to the customer. For this reason we set up last depreciation as a separate item of burden and have a distinct rate to cover it. We accomplish this by grouping our lasts by types,

divide the total depreciation by the normal capacity pair production and get a rate per pair to use in the unit cost.

To summarize we have material, labor, burden and last costs per unit to give us a total unit manufacturing standard cost. Standards are set at the point which we feel represents near-perfect performance. We seriously attempt to have standards so tight that in cost analyses management may set aside that part of cost which is standard and concentrate attention on the variations from standard.

Preparing the Periodic Reports

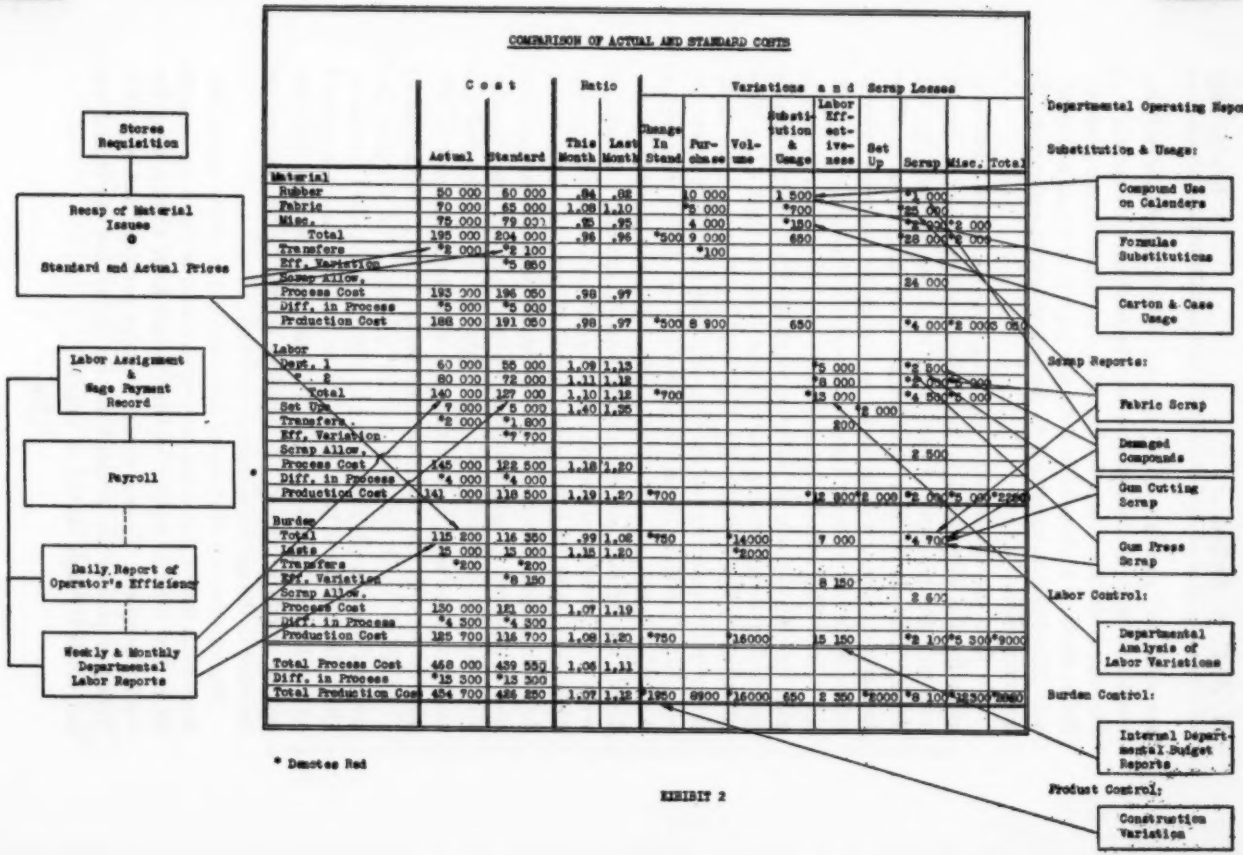
Basically, we follow the usual methods of relieving our stores accounts and payroll accounts of amounts chargeable to the current month's processing. At the same time the standard cost of each item must be developed in order that our charge into process be at the standard and that the balance between standard and actual, which is the variation, go to the proper penalty account. This applies both to material and labor. Burden charges all go direct to burden in process at standard, the efficiency and volume going separately to penalties.

To relieve our process accounts we—

1. Develop the standard cost of goods finished by extending the units produced by the unit standard cost subdividing this into:
   Material, material scrap, labor, labor scrap, labor set up, burden, burden scrap, and last depreciation.
2. Cost all scrap produced during the month at standard.
3. Cost all other variations from standard in like manner.

Reference to our comparison of actual and standard cost report, shown as Exhibit 2, will indicate how these figures are brought together. The figures shown in the form are only added for the purpose of illustration, they are neither actual nor comparative. We do not use a cost ledger, as this report is definitely tied in with the general ledger and serves all the functions of a separate cost ledger.

We start with the charges into process. Stores issues, as tabulated monthly from the stores cards and priced both at actual aver-



COMPARISON OF ACTUAL AND STANDARD COSTS

	Cost		Ratio		Variations and Scrap Losses								
	Actual	Standard	This Month	Last Month	Change In Stand	Purchase	Volume	Substitution & Usage	Labor Effectiveness	Set Up	Scrap	Misc.	Total
Material													
Rubber	50 000	60 000	.84	.82		10 000		1 500			*1 000		
Fabric	70 000	65 000	1.08	1.10		*5 000		*700			*85 000		
Misc.	75 000	79 000	.95	.95		4 000		*130			*2 000	*2 000	
Total	195 000	204 000	.96	.96	*500	9 000		650			*88 000	*2 000	
Transfers	*2 000	*2 100				*100							
Eff. Variation		*5 850											
Scrap Allow.											84 000		
Process Cost	193 700	196 050	.98	.97									
Diff. in Process	*5 000	*5 000											
Production Cost	188 000	191 050	.98	.97	*500	8 900		650			*4 000	*2 000	6 050
Labor													
Dept. 1	60 000	56 000	1.09	1.13					*5 000		*2 500		
" 2	80 000	72 000	1.11	1.12					*8 000		*2 500	*3 000	
Total	140 000	127 000	1.10	1.12	*700				*13 000		*4 500	*5 000	
Set Ups	*7 000	*5 000	1.40	1.25						*2 000			
Transfers	*2 000	*1 800							200				
Eff. Variation		*7 700											
Scrap Allow.											2 500		
Process Cost	145 000	122 500	1.18	1.20									
Diff. in Process	*4 000	*4 000											
Production Cost	141 000	118 500	1.19	1.20	*700				*12 800	*2 000	*2 000	*5 000	*2200
Burden													
Total	115 800	116 350	.99	1.02	*750		*14000		7 000		*4 700		
Misc.	15 000	13 000	1.15	1.20			*2000						
Transfers	*200	*200											
Eff. Variation		*8 150							8 150				
Scrap Allow.											2 500		
Process Cost	130 000	121 000	1.07	1.19									
Diff. in Process	*4 300	*4 300											
Production Cost	125 700	116 700	1.08	1.20	*750		*16000		15 150		*2 100	*5 300	*9000
Total Process Cost	468 000	439 550	1.06	1.11									
Diff. in Process	*15 300	*15 300											
Total Production Cost	454 700	426 250	1.07	1.12	*1950	8900	*16000	650	2 350	*2000	*8 100	*8300	2050

* Denotes Red

EXHIBIT 2

age costs and standard costs, support every charge into our material accounts. We maintain a finer breakdown of materials than illustrated, the form here having been condensed for convenience. Labor likewise is charged in from the payroll at actual and standard. Burden is accumulated in the ledger and transferred to the burden section.

We then use our various operating reports, which have been made up and distributed to the departments responsible, for determining the penalties. Changes in standard represent the difference between current specification costs and those in effect January 1. The purchase variation represents the price differential on materials issued at standard material prices and actual average costs. The substitution and usage total shows excess cost or gain through the use of different materials than those originally specified or through using more or less than specified. The labor effectiveness figure shows the loss resulting directly from inefficiency in labor and corresponds exactly with the weekly labor control sheets made up from pay records. Set ups are reported at the actual cost from payroll and at standard cost from units produced, the balance going into the penalty account. Volume is arrived at from our absorption chart which will be dwelt on later. Scrap cost gives us a summary of all scrap made, supported in detail by various reports. As an offset we enter the scrap allowance in standard for goods finished and arrive at our scrap penalty. Miscellaneous represents such variations as are not detailed and usually carries only a provision for inventory differences. We next accumulate the variations and scrap made to be entered as a deduction from standard cost of charges, thus bringing our charges, down to net standards as figured into standard unit costs. Units finished have been extended at standard and are entered on the finished goods line and the difference between standard cost of goods processed and finished represents the increase or decrease in the goods in process inventory.

The introduction of standard costs into our accounts meant little more to us than a systematic attempt to coordinate into our records all of the various reports which we had been accumulating for control purposes. Scrap, always a major problem, had been controlled in pounds for generations; we simply tied the record into our books through the use of values.

Forecasts and Budgets

We forecast production costs, sales and earnings annually by months and monthly during the year we budget the same items for the following month, revising them to the latest available trends. At the close of the month we compare actual results with the bud-

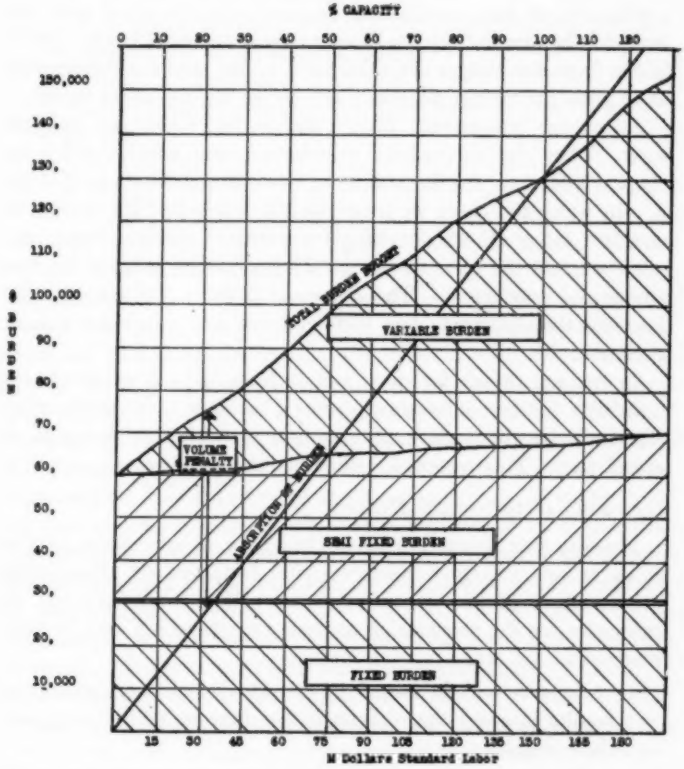


EXHIBIT 3

get and report causes of variations in detail to the central organization.

Controllable departmental expenses are budgeted on the basis of standard hours produced in each department by classes of ex-

pense. In doing this we set up first from the forecasted production for the following month a forecast of what the budget allowance will be for each class of expense in each department and send these allowances out to the department heads. In this way, we prepare the organization in advance for changing production schedules. When the month is completed, actual results based on the production of that month and its costs are compared with the budgeted figures and reported back to the department heads. Deviations from the budget are minimized by the advance information as to what the budget allowance will be for the following month.

All of our budgets are closely tied in and related to standard costs. They give us the basic information from which our burden chart is built up. An illustration of this chart is shown as Exhibit 3. In using the chart we locate on the lower line the dollars of standard labor absorbed during the period. Directly above this point we find the total burden as allowed in the budgets for that amount of production. The difference between the total burden line and the absorption line then gives us our figure for volume variation.

In making up all forecasts and budgets we use primarily the standards for the units anticipated to be made, and adjust these standards by the factors of variation to arrive at forecasts of actual cost. This materially simplifies the problem.

Operating Departmental Reports

Possibly our greatest problem has been to coordinate reports of operations, interpret them into vital facts and get them before the members of our organization for action. We have set up principles for the preparation of these reports which may be summarized as follows:

> Reports will be issued to provide information as to past results in order that definite *action* may be taken to improve these results.
>
> Reports issued to one member of our organization for action will go to another for *follow up*. Very few reports will be issued for follow up only.
>
> No regular reports will be issued solely for information, but action or follow up reports may go to some members of the organization for the purpose of information.

Our functional departments in connection with reports are responsible for:

Usefulness of report.
Data to be shown.
Circulation.
Plan action to improve results.
Meet at regular periods with foreman or executive affected, to discuss the data and plan action.
Delegate responsibility for action.
Issue detail instructions in connection with each report covering:

Source of data.
Method of compilation.
General suggestions for action.
How to interpret report.

Fabric scrap constitutes our greatest single exposure to material loss. Consequently it receives close attention. Daily records of stock cut and scrap made are obtained. Weekly efficiencies in cutting are built up and used as a base upon which operators' responsible are paid a bonus for each per cent which they cut below standard, this standard including an allowance for normal overrun as compared with paper layouts. Monthly we accumulate all fabric scrap reports into a summary form to show it as it enters into our cost records. Here we show departmental scrap in pounds, total scrap per cent by types of fabric at both standard and actual, pounds variation, dollar variation by fabrics and dollar variation by departments.

Variations in formulae of rubber compounds must also be closely followed. An average formula contains approximately ten ingredients varying greatly in proportions used and cost per pound. For various technical reasons these ingredients are constantly changing. Our control is on a cubic foot basis, as all compounds must enter the product as so much specified volume. We price all compounds mixed during the month at their standard costs and actual cost, report back to those responsible the pounds and values of compounds mixed over standard, under standard, and at standard. We then detail by formula number all compounds mixed at an excess cost over standard.

Usage of compound in coating fabrics presents another problem. To account for this we accumulate all actual and standard usage of compound on fabric and report back the variances.

Gum scrap is another source of loss. While this item has been more or less neglected until recent years due to the fact that the scrap can be re-run, it is now receiving close attention. We have found serious losses here on labor and burden in re-running, together with hazards of dirt, contamination with other stocks, etc., which all accumulate to make gum scrap an important factor to be controlled. All gum scrap is weighed by class of scrap and reported back by weight, standard cost, actual cost and variation.

Our compounds are very susceptible to spoilage. They are constantly classified downward or discarded. A complete record is maintained of these losses and costed either for the reduction in value or if discarded for their entire value. The facts here are summarized into a report for operating department action.

Labor cost receives our greatest attention. It is far more uncertain and subject to greater uncertainties than materials. Labor standards are set extremely tight; we do not hesitate to put in standards which at time of installation can be met only by skilled operators receiving perfect service from management and we hold management strictly accountable to provide service whereby operators will function efficiently. This all means that variations under our pay method will be high. We report back to operators on the day following production their efficiency rate for that day. At the close of the week every department receives a control sheet on labor summarizing that week's operations into such vital facts as: total payrolls by hours and amounts divided into classes of labor payments, i.e., direct wage bonus, day work, indirect labor, etc. These control sheets also show labor excess both in hours and amounts, broken down into the following classes of excess; low efficiencies, waiting, reoperation, make up, excess operators, day work, overtime and training.

This summarizes some of the reports which we supply to management for cost control. At every point concentration of effort is placed on variations, thus eliminating the major part of the cost from the immediate attention of the executive. The general management definitely places responsibilities for these variations on specific functional and operating departments. So long as these

departments function efficiently as indicated by various reports then general management passes them by to concentrate on other departments where cost ratios are unfavorable.

Management's first assumption that standard cost represents perfect performance would indicate the possibility that we overlook the fact that improvements can and must be made to keep in line with general industrial progress. This is not so, for we constantly strive to obtain greater efficiency in the standard cost of the goods themselves and accomplishments toward that end are readily measured in the change in standards variation account which we maintain.

Our management continuously drives to increase efficiency by elimination of waste, reduction of damaged goods, introduction of more efficient methods and control of burden. Publicity and presentation of our problems to every employee plays an important part in gaining the ends we hope to attain. A definite program of methods for attack is always linked up with assignments of responsibilities delegated definitely to the organization. Measurement of results must always be provided for. Accomplishments have in the past justified our methods.

THE COSTING OF RUBBER

By Frederick F. Hollowbush, Cost Accountant,
Seamless Rubber Co., New Haven, Conn.

RUBBER is the chief constituent of the coagulated milky juice or latex furnished by a number of different trees, shrubs, and vines. This latex is not to be confused with the sap of trees, on the circulation of which their nutrition depends. The latex is chiefly secreted in small sacs which reside in the cortical tissue between the outer bark and the wood.

It is usually obtained from the bark or stem by making an incision reaching almost to the wood, when the milky fluid flows more or less readily from the laticiferous vessels. It is, like milk, an emulsion, and when examined with the microscope, is seen to consist of numerous globules suspended in a watery fluid. When exposed to the air, the latex gradually undergoes putrefactive change, and it is to prevent this putrefactive change that the latex must be cured shortly after it has been gathered from the trees. In some cases this curing is accomplished by smoking over a wood fire, and in others, by the use of chemical reagents.

Because of the nature of its gathering and preparation for the market, rubber usually contains a great deal of foreign matter that must be removed before it can be used for the manufacture of goods.

Processing the Rubber

Several steps in the processing of rubber before it is ready for compounding, are:

1. *The storage of green rubber, opening the cases, and tearing the rubber apart.* The elements involved in costing rubber at this point are: the purchase price of the material, a small amount of labor, and a considerable overhead, which is made up largely of the rent for space occupied.

2. *Washing and Drying.* This operation is accomplished by passing the rubber through huge corrugated rolls, over which a constant stream of water is played. The rubber is then placed on trays, put into a steam-heated room, and kept there until it has been completely dried. The elements involved in costing rubber at this point are, the cost as arrived at in No. 1, plus additional

labor and overhead for washing and drying. Costing at this point must take into consideration the loss that occurs through washing and drying. This loss may run anywhere from 1% to 30%, depending on the kind and condition of the rubber involved.

3. *Refining,* or breaking down, as it is commonly known, is nothing more than mastication between huge rolls until the rubber has become a soft plastic mass. Elements involved in costing are the cost arrived at in No. 1 if the rubber has not been washed, No. 2 if it has been washed and dried, plus additional labor and overhead for refining. A huge part of the refining overhead will be made up of power.

Coding Rubber

Before we can get our system set up, we must code the different kinds of rubber, and the different processes through which the rubber may or may not pass. The following key will give you a clear picture of how this is done.

First Digit

#1. Represents Fine Para Rubber.
#3. Represents Smoked Sheet Rubber.
#4. Represents Pale Crepe.

Second Digit

#1. Represents rubber that is used green, without washing, drying, or refining. This rubber is simply torn apart, inspected, and then used to make compound without any further processing. On the other hand, it may be further processed as rubber.
2. Represents rubber that has been washed and dried.
#3. Represents rubber that has been washed, dried, and refined.
#4. Represents rubber that has been torn apart, inspected, and then refined, without having gone through the process of washing and drying. In other words, it is refined green rubber.

Example of the use of the above numbers:

#13 is fine para, washed, dried, and refined.
#41 is pale crepe, without washing, drying, or refining.

Standard Overhead rates

Overhead rates are set for each of the three production centers.

1. *Storage and Handling, Cutting and Inspecting*

   This rate is based on the normal pounds handled, and is applied to production at a standard rate per pound. As previously stated, the rental charge for storage space is included in this rate.

2. *Washing and Drying*

   This rate is based on the normal pounds washed and is applied to production at a standard rate per pound of rubber *washed, not dried.* The rate is applied to the weight of rubber washed, rather than to the weight dried for the reason that there is a considerable loss in product at this point, and to apply overhead on dry weight would serve to undercost those kinds of rubber having the greatest loss factor.

3. *Refining*

   Power cost is a very large element of cost in this operation, and it is therefore deemed advisable to set a standard overhead rate based on refining mill minutes.

Costing Plan

Now that we have a pretty fair picture of what it is all about, we will follow the detail of costing from start to finish.

When the shipment of rubber is received at the factory, a ticket is put on the shipment, showing on what contract, and of what shipment or lot it is a part.

The mill department makes out a requisition (see Form No. 1) for its requirements, and the stores department delivers the rubber, marking the requisition with the lot number, kind, and quantity delivered. Rubber is withdrawn from stores only as it is required, consequently it is all cleaned and cut, as fast as it is drawn. Here then, is our first cost point.

The total requisitions for the month are tabulated, and priced at the actual purchase price of each lot. The summary of these requisitions is then transferred to Form No. 2.

Most of the information on this form is self-explanatory. Since there is no loss in cutting or tearing the green rubber apart, the

Form No. 1 — Requisition for Material — No. 27569

Date Mar. 31, 1933

Drawn by Dept. No. 1a Rubber — From Dept. No. 32 Stores

LOT NO.	POUNDS	KIND	PRICE	AMOUNT
7xx	1000	Fine Para	.030	30.00
945	2000	Smoked Sheet	.035	70.00
1040	3000	Pale Crepe	.040	120.00

CHARGE a

Filled by J.S.

Checked by W.H.

C.C. FOREMAN

1207

total pounds used or delivered to the mill department are the pounds of product entered in column 6 for the first operation.

Material costs per pound and in total are secured from the requisitions. The labor cost, entered in columns 9 and 10, may be obtained in many different ways, depending on just how accurate a cost is desired, and how much information is available. Perhaps the simplest method is to abstract the labor from the payroll, and prorate it on the pounds used.

In applying overhead, column 11 is used where the overhead is applied at a standard rate per minute, while column 12 is used where the overhead is applied on a per pound basis. The total of material, labor and overhead costs is entered in column 14 and cost per pound obtained by dividing this figure by the pounds of product in column 6.

In the final column the new code number is recorded. You will recall that in coding, all rubber, once it has been cut and torn apart, becomes second digit No. 1 rubber. To make this clear, notice how the codes in column 16 differ from those in column 2.

We now have a cost of each different kind of rubber that has taken into consideration the actual purchase price, plus the storage facilities, direct labor, and other overhead items involved in getting the rubber in shape to use.

Washing and Drying

As explained in the preface, the method of gathering and preparing certain kinds of rubber for the market contaminates it with a great deal of foreign matter, and in order to remove it, it is necessary to thoroughly wash the rubber.

The kind and quantity washed and dried is reported on a daily operating report (see Form No. 3). Now, the drying of rubber requires a much longer period of time than one day, and in order to get the correct dry weight obtained from any given quantity of green rubber, it is necessary to be sure that the dry weight has been obtained for all rubber which has been washed during that particular month. This means that it will be several days after the end of the month before the last drying report for the previous month can be obtained.

Costing is accomplished on Form No. 2, and is done as follows: The total weight of each kind of rubber before washing, and after

FORM NO. 2

CRUDE RUBBER - DEPARTMENT - 1A

Production and Cost Report

Month of Mar 1933

LOT NO	NO	DESCRIPTION KIND	WEIGHT OF MATERIAL POUNDS USED	% LOSS	POUNDS LOSS	POUNDS PRODUCT	COST OF MTL. PER POUND	COST OF MTL. AMOUNT	LABOR RATE	LABOR AMOUNT	OVERHEAD MIN.	OVERHEAD RATE	OVERHEAD AMOUNT	TOTAL COST AMOUNT	COST PER Lb.	NO.
1	2	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
7xx	1	Fine Para	1000			1000	.0300	30.00	.0017	1.70		.005	5.00	36.70	.0367	11
9x5	3	Smoked Sheet	2000			2000	.0350	70.00	.0017	3.40		.005	10.00	83.40	.0417	31
10x10	4	Pale Crepe	3000			3000	.0400	120.00	.0017	5.10		.005	15.00	138.60	.0462	41
		Total Cut	6000			6000	.0367	220.00	.0017	10.20		.005	30.00	257.20	.0429	
	11	Fine Para	1000	20	200	800	.0367	36.70	.0043	4.30		.030	30.00	71.50	.0581	12
	31	Smoked Sheet	2000	02	40	1960	.0417	81.40	.0043	8.60		.030	60.00	151.00	.0770	32
	41	Pale Crepe	1000	01	10	990	.0462	45.70	.0043	4.30		.030	30.00	80.50	.0813	42
		Total Washed & Dried	4000	16	250	3750	.0462	164.50	.0043	17.20		.030	120.00	302.00	.0805	
	12	Fine Para	800			800	.1381	70.48	.0025	2.00	6.40	.025	16.00	88.48	.1106	13
	32	Smoked Sheet	1960			1960	.0770	150.92	.0025	4.90	15.68	.025	39.20	195.01	.0995	33
	42	Pale Crepe	800			800	.0813	46.45	.0025	1.25	4.00	.025	10.00	61.70	.0687	43
	41	Pale Crepe	1000			1000	.0462	46.20	.0025	2.50	8.00	.025	20.00			44
		Total Refined	4760			4760	.0748	308.75	.0025	10.65	34.08	.025	85.20	404.70	.0949	

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drying, is obtained from the daily report of operations (Form No. 3). At the end of the month, these reports are tabulated, and the total weight of each kind of rubber, both before washing, and after drying, is transferred to the costing sheet, Form No. 2.

Department No. 1 A Rubber
Daily Washing & Drying Report

Form No 3 Date 193

Used No	Kind	Pounds Washed	Labor Per Lb.	Amount	Pounds Dried	Dry No.	
11	Fine Para	1000	00½	5 00	800	12	
31	Smoked Sheet	2000	00½	10 00	1960	37	
41	Pale Crepe	1000	00½	5 00	990	42	

Department No. 1 A Rubber
Daily Refining Report

Form No. 9 Date 193

Used NO	Kind	Pounds Refined	Labor Per Lb.	Amount	Mill No	Mill Min.	Refined No	
12	Fine Para	800	00½	4 00	14	640	13	
32	Smoked Sheet	1960	00½	9 80	15	1568	33	
42	Pale Crepe	500	00½	2 50	16	400	43	
41	Pale Crepe	1000	00½	5 00	17	800	44	

It will be noticed that the weight before washing is included in column 3 and the weight after drying in column 6. The difference, representing the loss of poundage, is entered in column 5 and expressed as a percentage in column 4.

Material costs are based on the weight before washing times the cost per pound previously calculated in column 15.

The method of obtaining labor cost will again depend on the system of wage payment used. If no wage payment plan is in operation, care will be required in obtaining labor costs, as the

Form No 5 — Department 1 A Rubber Record

No 1 Green Rubber						No 2 Dry Rubber					No 3 Refined Dry					No 4 Refined Green					Used in Compound		
Date	Lot No.	Pounds	Total Rec'd	Pounds used	Total Used	Date	Pounds Prod.	Total Prod.	Pounds used	Total Used	Date	Pounds Prod.	Total Prod.	Pounds Used	Total Used	Date	Pounds Prod.	Total Prod.	Pounds Used	Total Used	Date	Pounds Used	Total Used

amount of labor required in washing different kinds of rubber is widely different. Certain kinds require four or five times the amount of effort required of other kinds.

Refining

Just as all rubber is not required to go through the washing process, all rubber is not required to be refined before it can be used to make compound.

The kind of rubber used, the kind produced and the time required to refine it, are reported daily on Form No. 4. At the end of each month, these daily reports are tabulated and the totals transferred to the costing sheeting, Form No. 2.

In connection with the refining process, it will be noticed that either second digit No. 1 or second digit No. 2 rubber may be used. The cost per pound is obtained from the appropriate section of column 15. The calculation of labor rates depends on the particular wage payment plan in operation, although the problem here is not so great as in the washing operation due to a smaller variation in the labor cost of refining different kinds and lots of rubber. Since this is largely a mechanical process, overhead is applied on the basis of mill minutes.

Now, if you have followed the cost Form No. 2, from start to finish, you will find that we start out with #1 Fine Para Rubber, at a purchase price of .03 per pound. We cut and clean this #1 Fine Para Rubber and arrive at a cost of .0362 per pound, for #11 Cut and Torn apart Fine Para. We then take the #11 Fine Para, and wash and dry it, obtain a price of .0881 per pound for #12 Cut and Torn, Washed and Dried Fine Para. Later we may wish to refine this same #12 Para Rubber. If so, the cost of #12 plus labor and overhead for refining will give us the cost of #13 Cut and Torn, Washed and Dried, and Refined Fine Para Rubber. This cost we find to be .1106 per lb., so what was .03 per pound at the market, really cost .11 per lb. before it was ready to use in the manufacture of goods.

The code system is progressive, is very easy for the workman to understand, and consequently, very easy to operate. Further, than that, it is elastic enough to cover many different kinds of rubber processed in many different ways.

In addition to the cost records, it is desirable for the operating department to know at all times, just how much rubber is in the department, and in exactly what condition it is. This is accomplished by means of a perpetual inventory. (See Form No. 5.)

The balance on hand may be obtained by simply deducting the total used from the total produced.

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